

Impact of the 2009 Attica wild fires on the air quality in urban Athens

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Abstract:

At the end of August 2009, wild fires ravaged the north-eastern fringes of Athens destroying invaluable forest wealth of the Greek capital. In this work, the impact of these fires on the air quality of Athens and surface radiation levels is examined. Satellite imagery, smoke dispersion modeling and meteorological data confirm the advection of smoke under cloud-free conditions over the city of Athens. Lidar measurements showed that the smoke plume dispersed in the free troposphere and lofted over the city reaching heights between 2 and 4 km. Ground-based sunphotometric measurements showed extreme aerosol optical depth, reaching nearly 6 in the UV wavelength range, accompanied by a reduction up to 70% of solar irradiance at ground. The intensive aerosol optical properties, namely the ångström exponent, the lidar ratio, and the single scattering albedo, showed typical values for highly absorbing fresh smoke particles. In-situ air quality measurements revealed the impact of the smoke plume down to the surface with a slight delay on both the particulate and gaseous phase. Surface aerosols increase was encountered mainly in the fine mode with prominent elevation of OC and EC levels. Photochemical processes, studied via NO x titration of O 3, were also shown to be different compared to typical urban photochemistry.

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Resource Description

Exposure : ☒

weather or climate related pathway by which climate change affects health

Air Pollution, Extreme Weather Event, Solar Radiation

Air Pollution: Ozone, Particulate Matter, Other Air Pollution

Air Pollution (other): NOx

Extreme Weather Event: Wildfires

Geographic Feature: ☒

resource focuses on specific type of geography

Urban, Other Geographical Feature

Climate Change and Human Health Literature Portal

Other Geographical Feature : forest

Geographic Location: 

resource focuses on specific location

Non-United States

Non-United States: Europe

European Region/Country: European Country

Other European Country : Greece

Health Impact: 

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Resource Type: 

format or standard characteristic of resource

Research Article

Timescale: 

time period studied

Time Scale Unspecified